

## **GALILEO AT JUPITER: ORBITER OBSERVATIONS OF JUPITER, RINGS, AND SATELLITES**

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The Galileo spacecraft has been in orbit since December, 1995. During the course of its two year prime mission it has provided us our most detailed look yet at the Jupiter system. This paper reviews the major observations and discoveries from the Galileo orbital mission to date. These include: 1. Observations of lightning and aurora in Jupiter's atmosphere, 2. Discovery that the water abundance in the deep atmosphere varies by orders of magnitude from place to place, 3. Confirmation that "five micron hotspots" such as the Probe entry site are regions of massive, dry downdrafts, 4. Discovery of ubiquitous erosion and surface deposition processes on Callisto, previously thought to be a relatively unmodified, "primitive" satellite surface, 5. Discovery that the non-ice material on Ganymede and Callisto contains carbon, nitrogen, and sulfur bearing compounds as well as carbon dioxide in microscopic deposits in the surface material, 6. Images of large regions on Europa that appear to be regions of older icy crust disrupted and broken apart, creating ice "rafts" which have moved and rotated in a soft ice matrix, suggesting underlying liquid water, 7. Identification of heavily hydrated salts of magnesium and sodium sulfate as a major constituent of the younger regions of Europa, 8. Recognition that ubiquitous, very high temperature silicate volcanism is involved in much of Io's massive volcanic activity, suggesting lava compositions similar to those erupted during the Archean on the Earth, 6. New measurements of Jupiter's main ring and its extended components. Galileo is currently embarked on an extended mission phase intended to make more detailed studies of Europa and end in 1999 with two close flybys of Io if the spacecraft systems can survive the continued build up of radiation damage in Jupiter's intense radiation belts.

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